FIG. 1

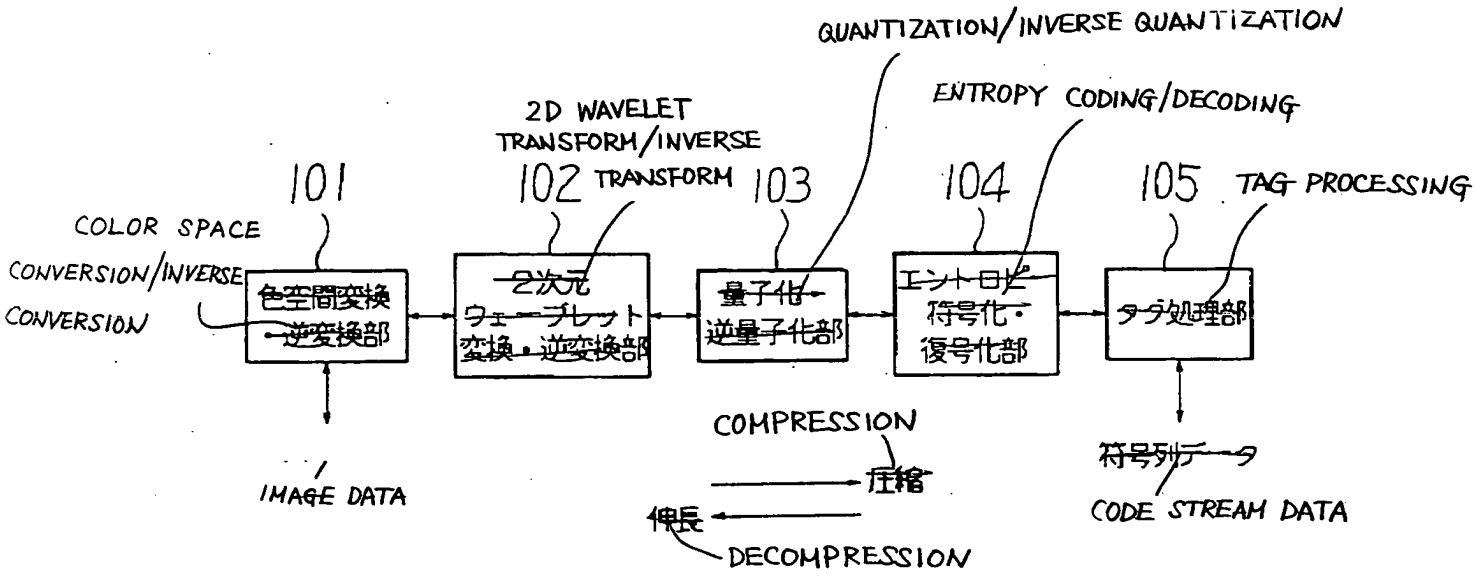

QUANTIZATION/INVERSE QUANTIZATION
ENTROPY CODING/DECODING
2D WAVELET TRANSFORM/INVERSE TRANSFORM
101
102
103
104
105
TAG PROCESSING
COLOR SPACE CONVERSION/INVERSE CONVERSION
色空間変換・逆変換部
2次元ウェーブレット変換・逆変換部
量子化・逆量子化部
エントロピー符号化・復号化部
タグ処理部
IMAGE DATA
COMPRESSION
圧縮
伸長
DECOMPRESSION
符号列データ
CODE STREAM DATA

FIG. 2

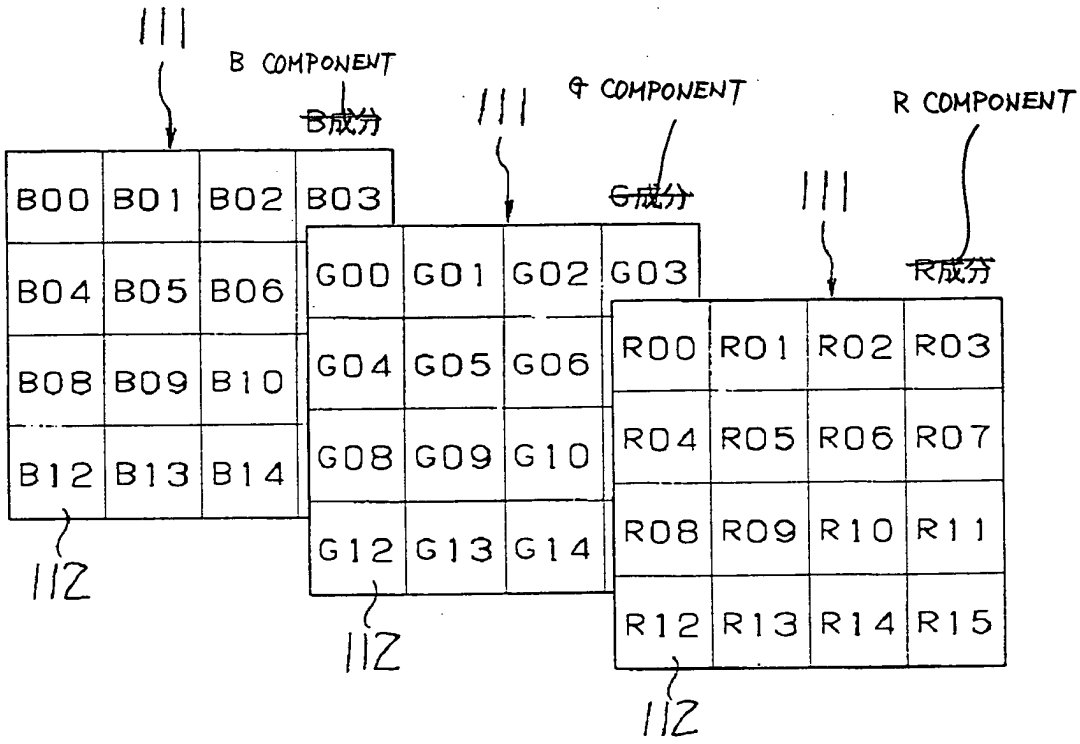

111
B COMPONENT
B成分
B00 B01 B02 B03
B04 B05 B06
B08 B09 B10
B12 B13 B14
112
111
G COMPONENT
G成分
G00 G01 G02 G03
G04 G05 G06
G08 G09 G10
G12 G13 G14
112
111
R COMPONENT
R成分
R00 R01 R02 R03
R04 R05 R06 R07
R08 R09 R10 R11
R12 R13 R14 R15
112

FIG. 3

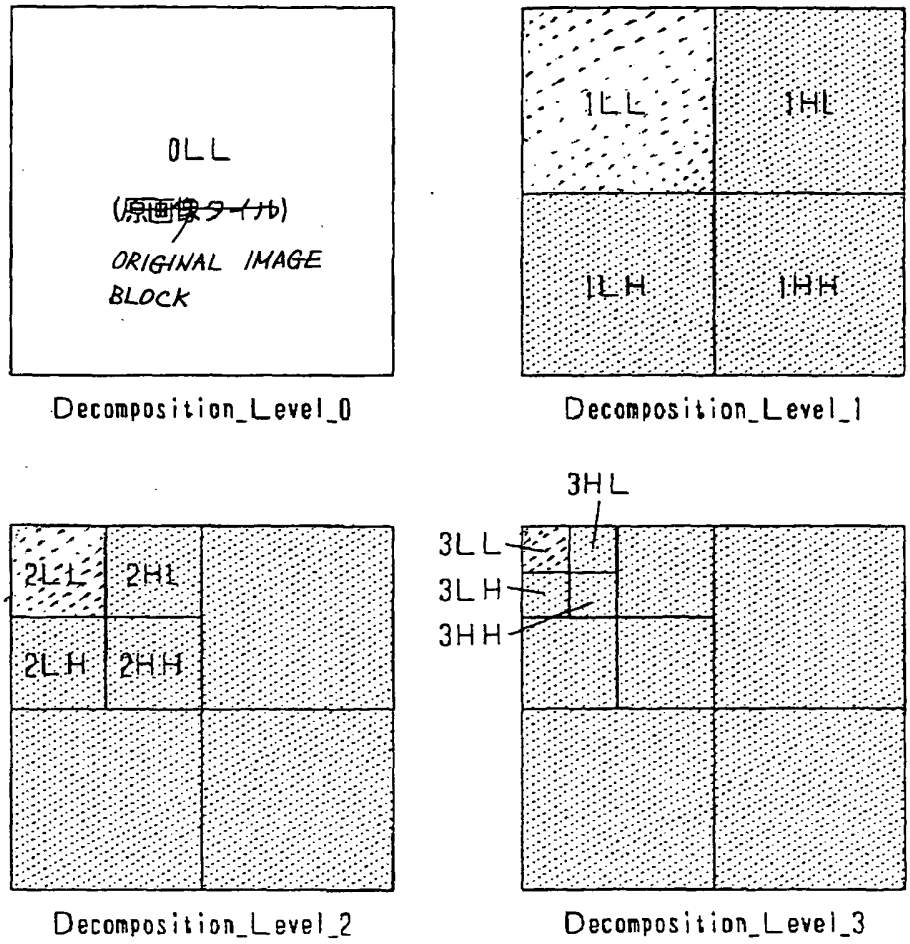

0LL
(原画像タイル)
ORIGINAL IMAGE BLOCK
Decomposition_Level_0
1LL
1HL
1LH
1HH
Decomposition_Level_1
2LL
2HL
2LH
2HH
Decomposition_Level_2
3HL
3LL
3LH
3HH
Decomposition_Level_3

FIG. 4

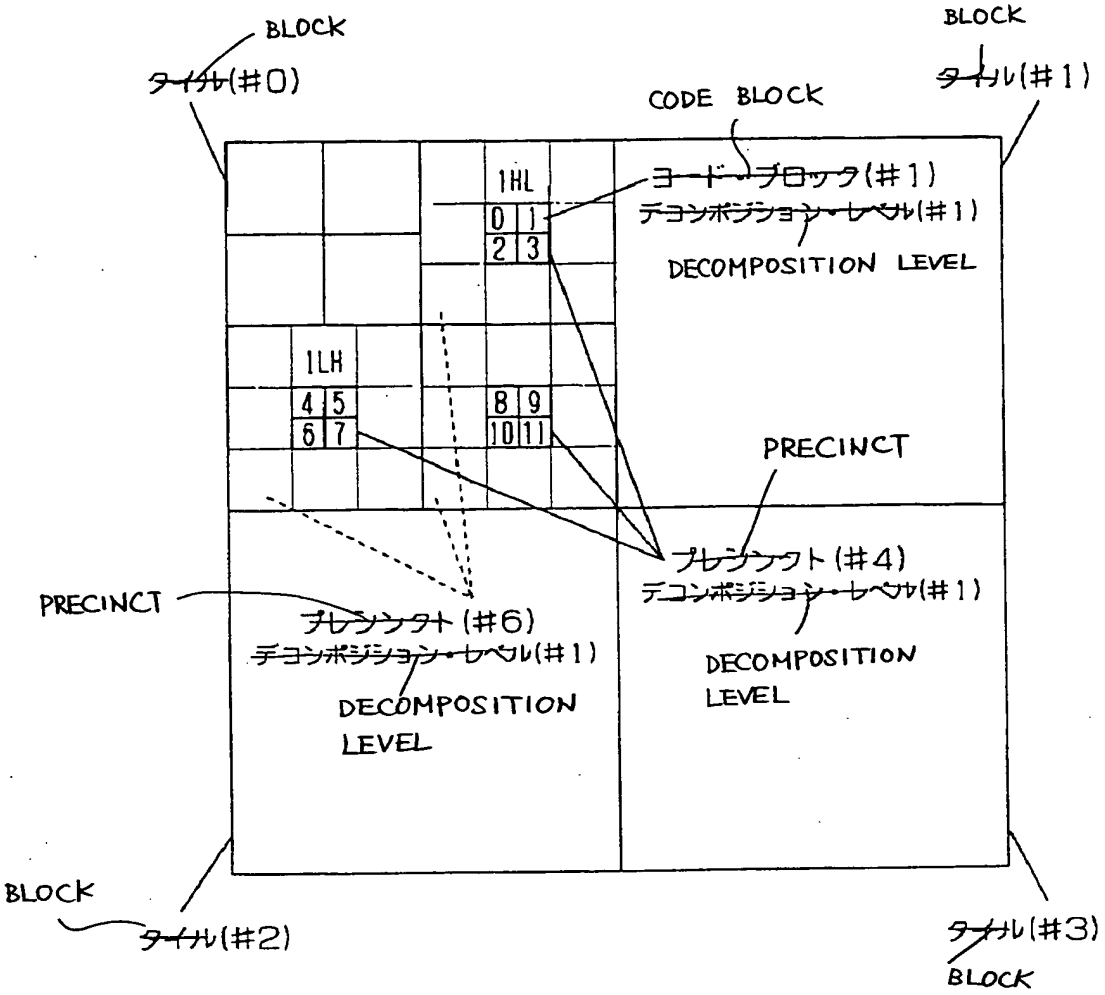

BLOCK
タイル(#0)
BLOCK
タイル(#1)
CODE BLOCK
コード・ブロック(#1)
デコンポジション・レベル(#1)
DECOMPOSITION LEVEL
1HL
0 1
2 3
1LH
4 5
6 7
8 9
10 11
PRECINCT
プレシンクト(#4)
デコンポジション・レベル(#1)
DECOMPOSITION LEVEL
PRECINCT
プレシンクト(#6)
デコンポジション・レベル(#1)
DECOMPOSITION LEVEL
BLOCK
タイル(#2)
タイル(#3)
BLOCK

FIG. 5

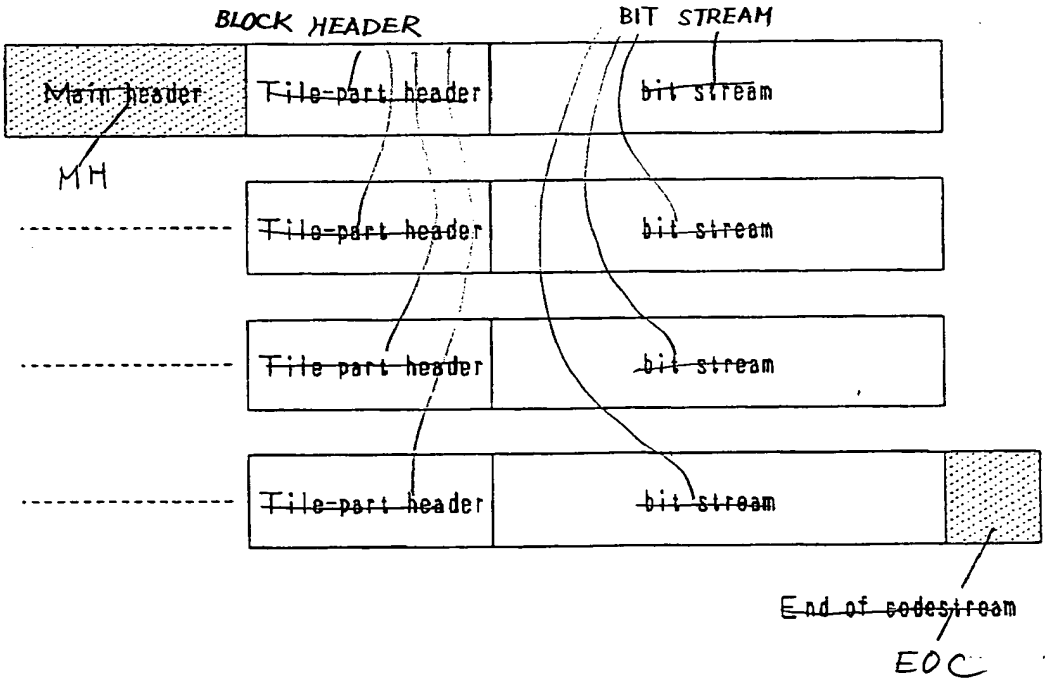

BLOCK HEADER
BIT STREAM
Main header
File-part header
bit stream
MH
File-part header
bit stream
File-part header
bit stream
File-part header
bit stream
End of codestream
EOC

FIG. 6

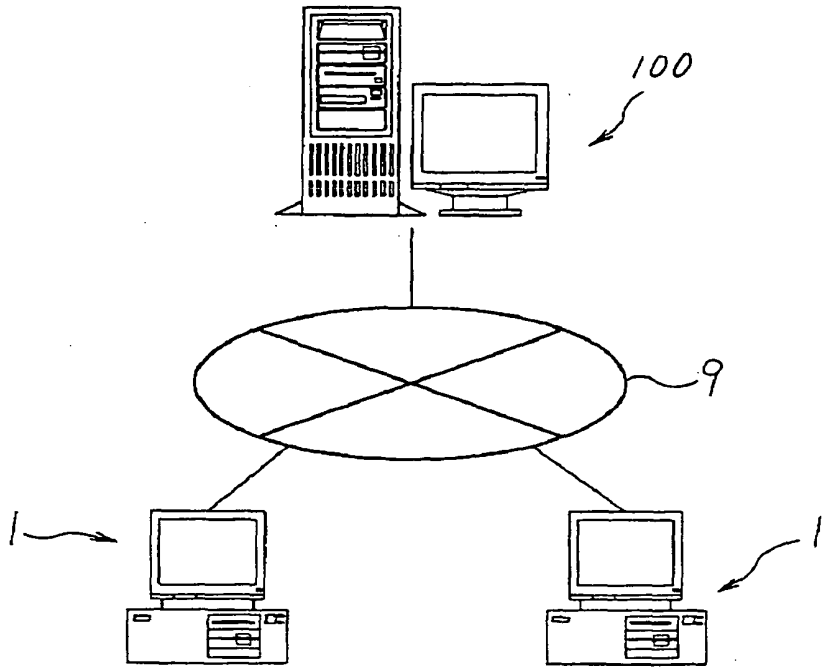

100
9
1
1

FIG. 7

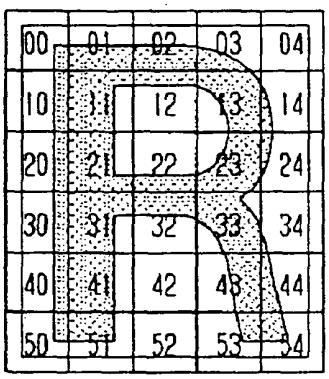

00
01
02
03
04
10
11
12
13
14
20
21
22
23
24
30
31
32
33
34
40
41
42
43
44
50
51
52
53
54

FIG. 8

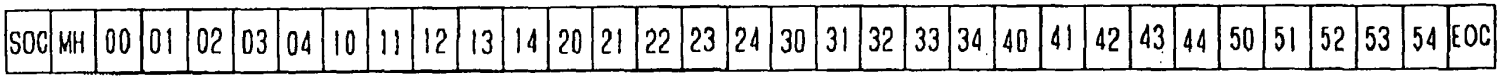

SOC
MH
00
01
02
03
04
10
11
12
13
14
20
21
22
23
24
30
31
32
33
34
40
41
42
43
44
50
51
52
53
54
EOC

FIG. 9

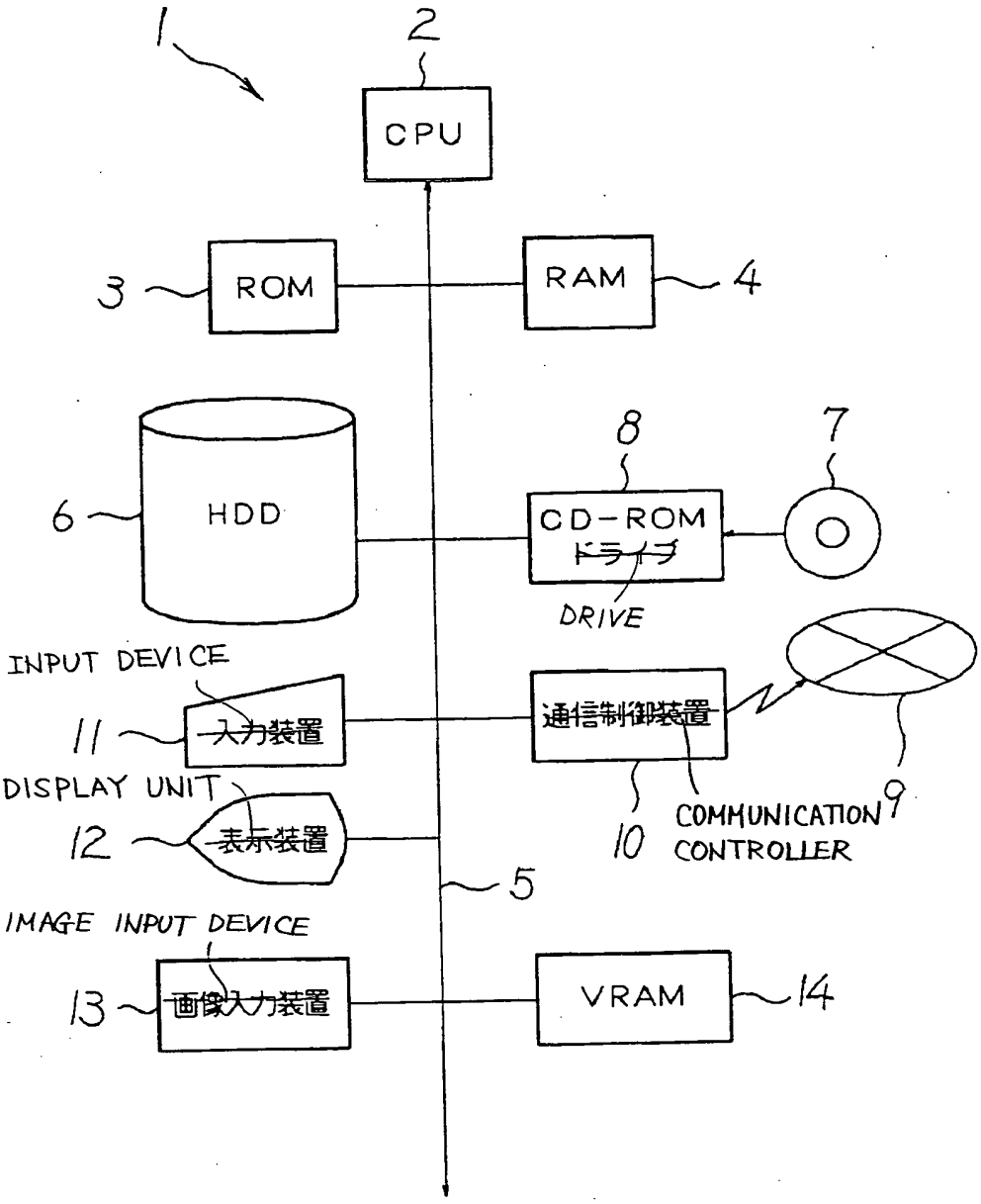

1
2
CPU
3
ROM
RAM
4
6
HDD
8
CD-ROM
ドライブ
DRIVE
7
INPUT DEVICE
11
入力装置
通信制御装置
DISPLAY UNIT
12
表示装置
10
COMMUNICATION CONTROLLER
9
5
IMAGE INPUT DEVICE
13
画像入力装置
VRAM
14

FIG. 10

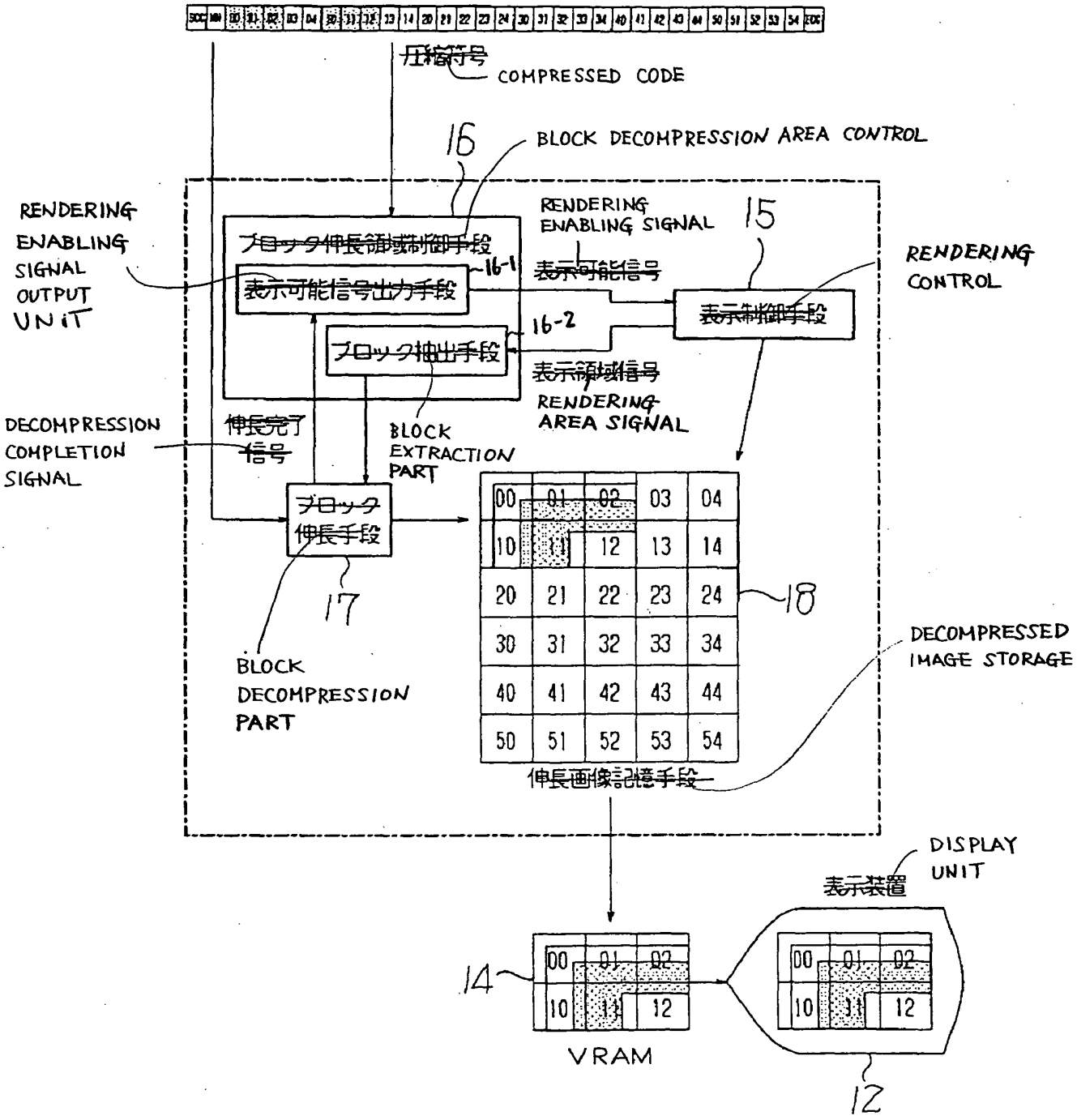

圧縮符号
COMPRESSED CODE
16
BLOCK DECOMPRESSION AREA CONTROL
RENDERING ENABLING SIGNAL OUTPUT UNIT
RENDERING ENABLING SIGNAL
15
RENDERING CONTROL
ブロック伸長領域制御手段
16-1
表示可能信号出力手段
表示可能信号
表示制御手段
16-2
ブロック抽出手段
表示領域信号
RENDERING AREA SIGNAL
DECOMPRESSION COMPLETION SIGNAL
伸長完了信号
BLOCK EXTRACTION PART
ブロック伸長手段
17
BLOCK DECOMPRESSION PART
18
DECOMPRESSED IMAGE STORAGE
伸長画像記憶手段
DISPLAY UNIT
表示装置
14
VRAM
12

FIG. 11

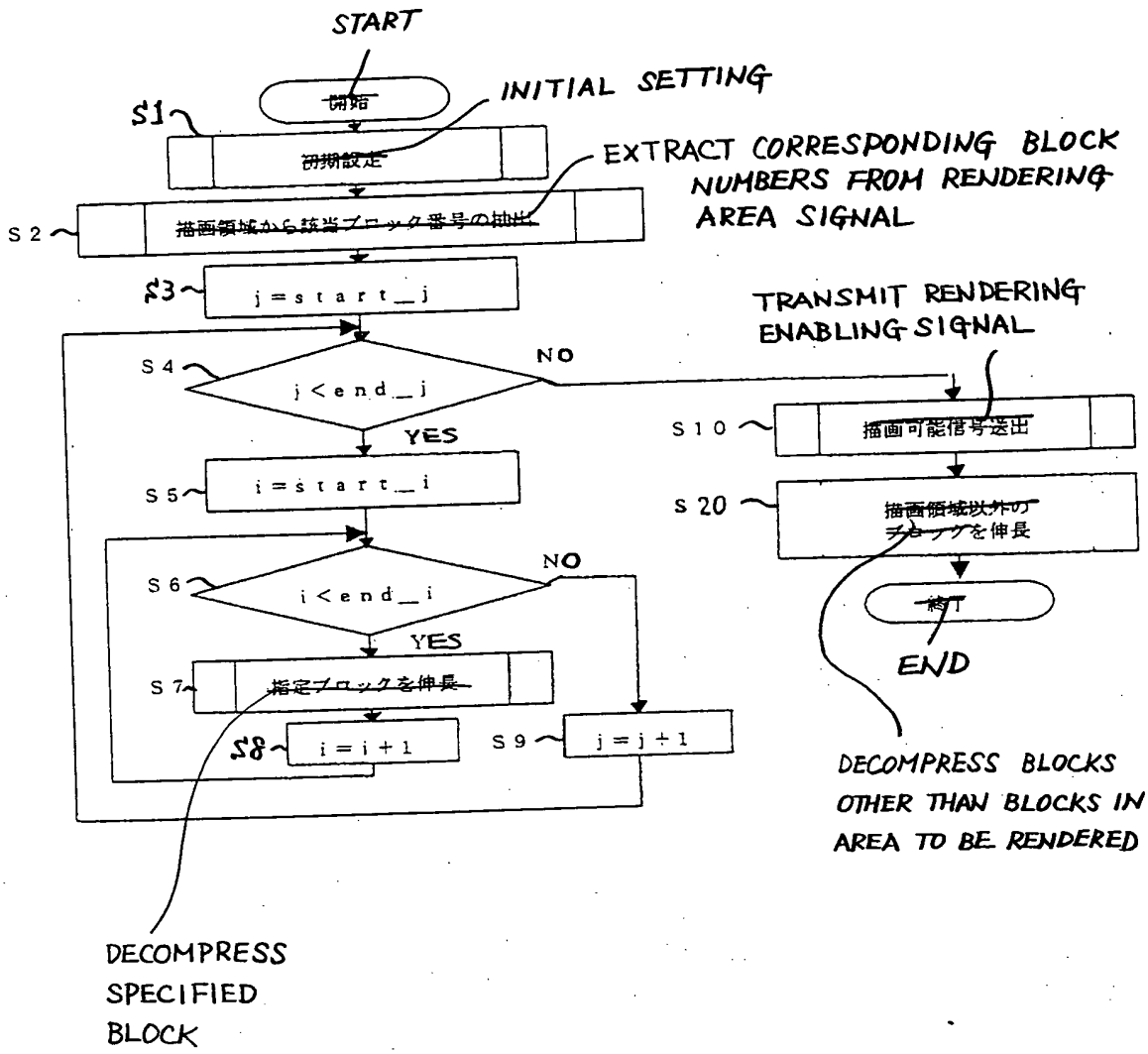

START
開始
INITIAL SETTING
S1
初期設定
EXTRACT CORRESPONDING BLOCK NUMBERS FROM RENDERING AREA SIGNAL
S2
描画領域から該当ブロック番号の抽出
S3
j = s t a r t _ j
TRANSMIT RENDERING ENABLING SIGNAL
S4
j < e n d _ j
NO
YES
S10
描画可能信号送出
S5
i = s t a r t _ i
S20
描画領域以外のブロックを伸長
S6
i < e n d _ i
NO
YES
終了
END
S7
指定ブロックを伸長
S8
i = i + 1
S9
j = j + 1
DECOMPRESS BLOCKS OTHER THAN BLOCKS IN AREA TO BE RENDERED
DECOMPRESS SPECIFIED BLOCK

FIG. 12

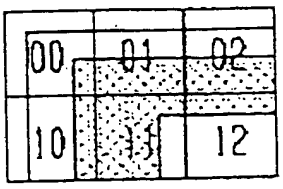


FIG. 13

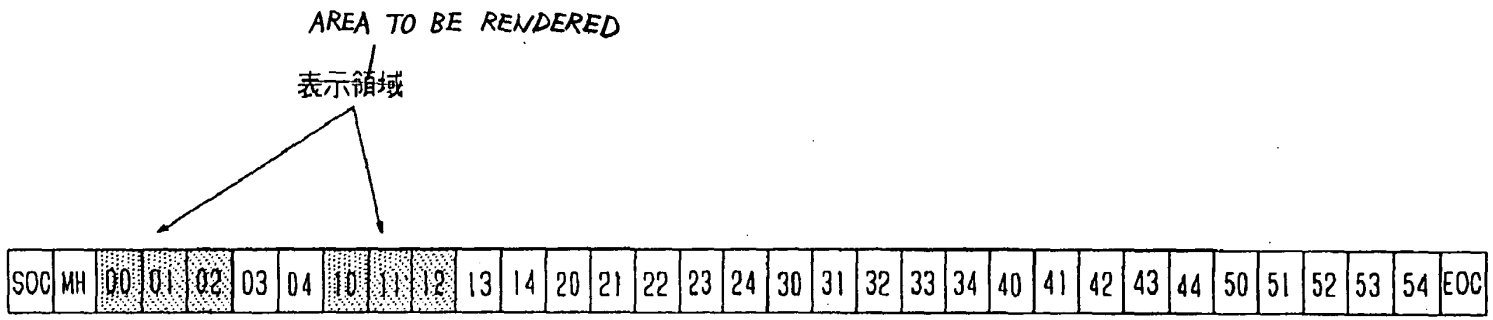

AREA TO BE RENDERED
表示領域
SOC
MH
00
01
02
03
04
10
11
12
13
14
20
21
22
23
24
30
31
32
33
34
40
41
42
43
44
50
51
52
53
54
EOC

FIG. 14

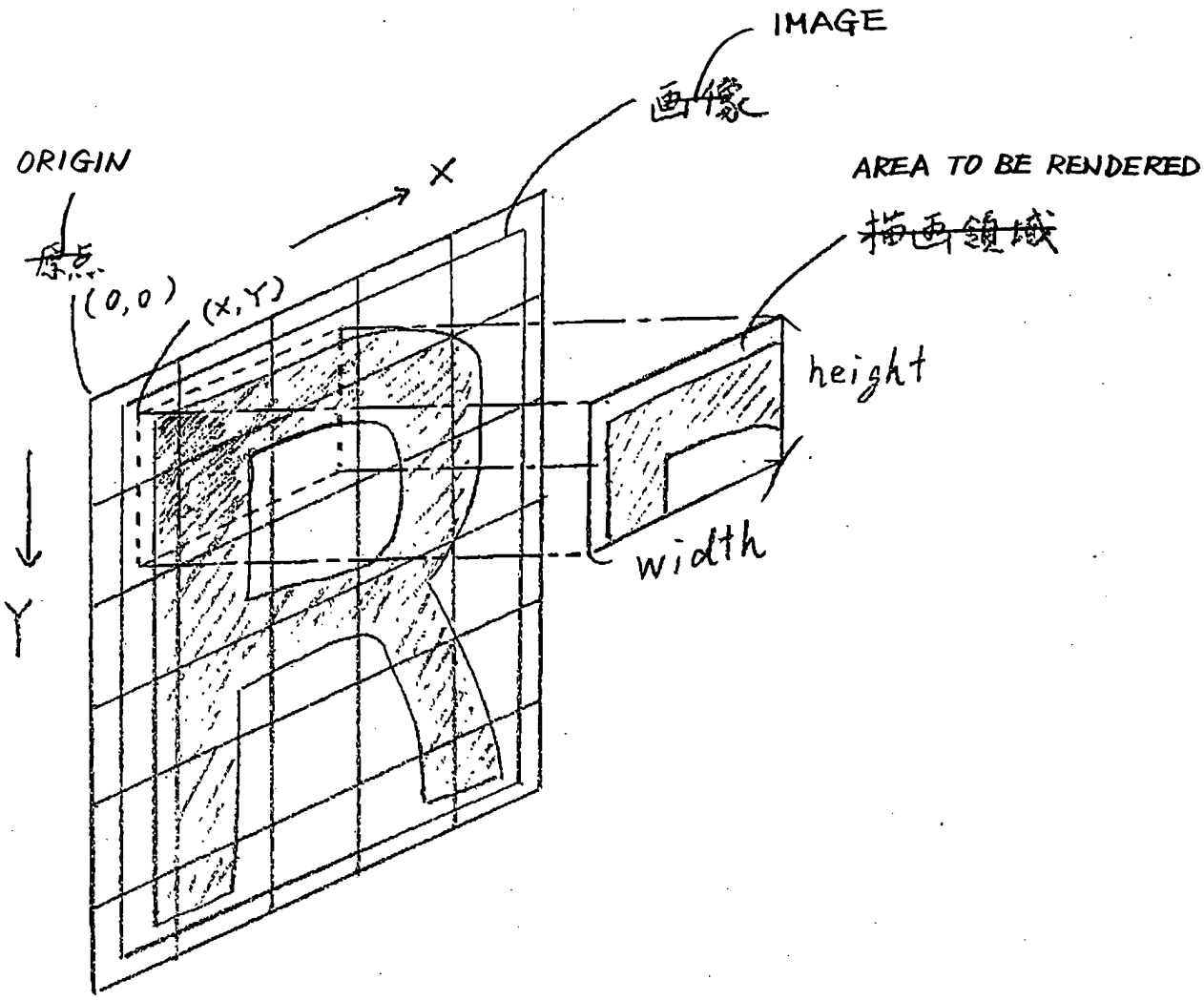


IMAGE
画像
ORIGIN
原点
X
AREA TO BE RENDERED
描画領域
(0,0)
(x,Y)
height
width
Y

FIG. 15

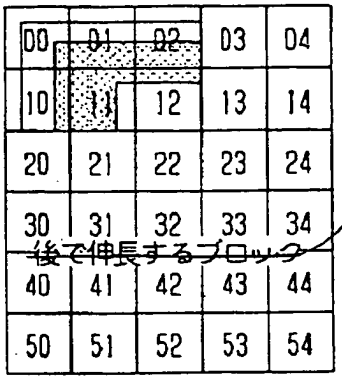


FIG. 16

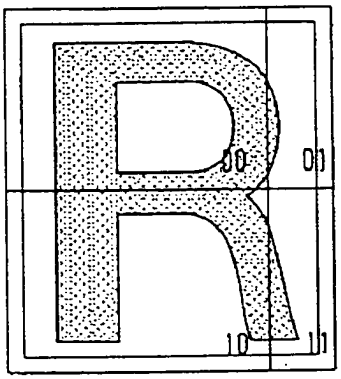


FIG. 17

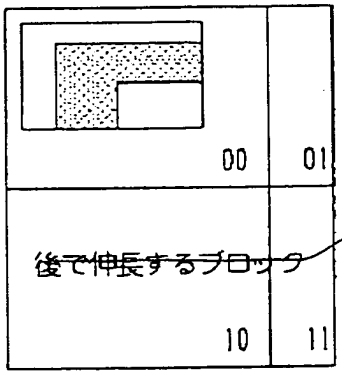


FIG. 18

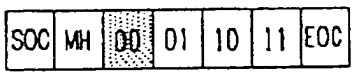


FIG. 19

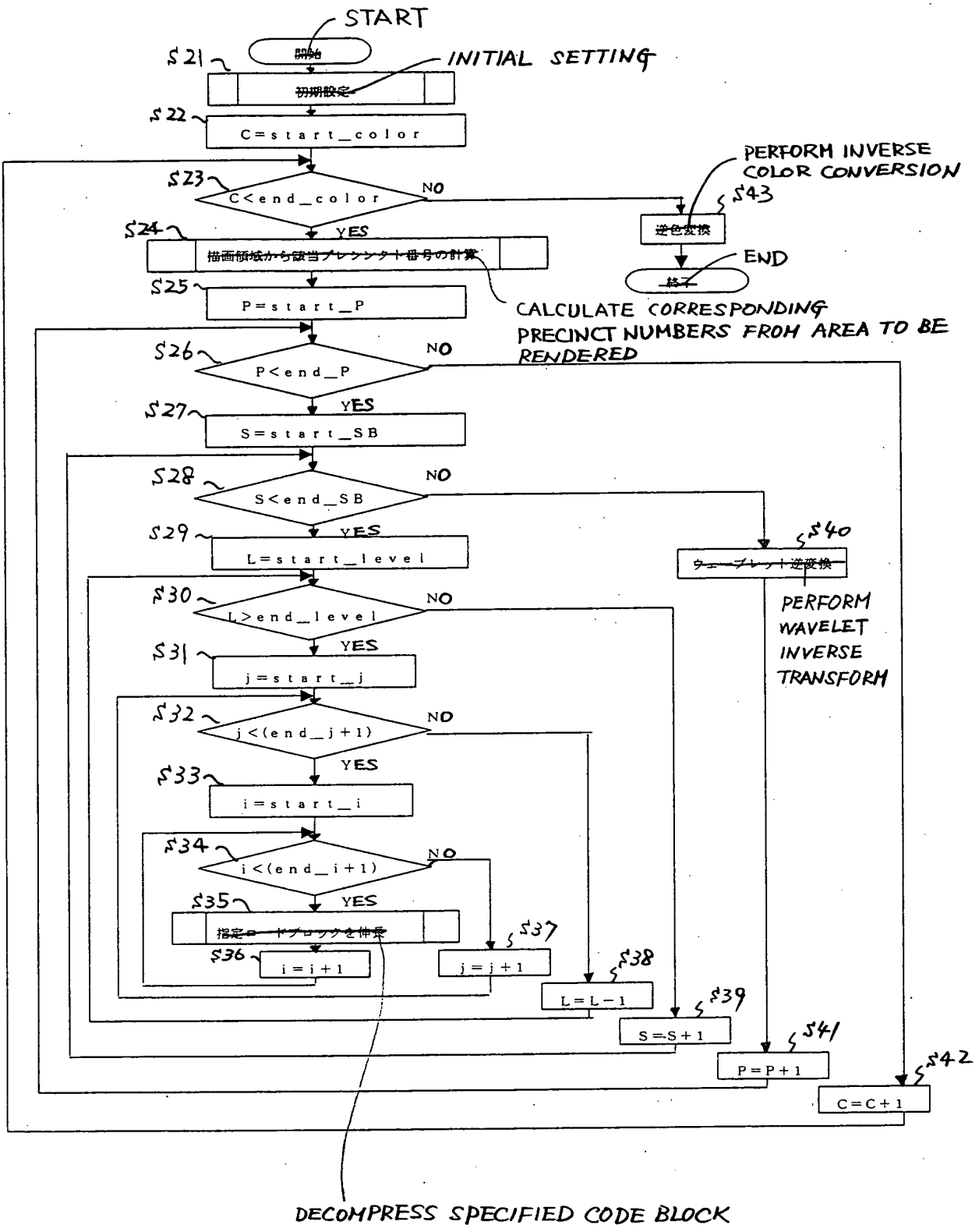

START
開始
S21
初期設定
INITIAL SETTING
S22
C=start_color
S23
C<end_color
NO
YES
S24
描画領域から該当プレシンクト番号の計算
CALCULATE CORRESPONDING PRECINCT NUMBERS FROM AREA TO BE RENDERED
S25
P=start_P
S26
P<end_P
NO
YES
S27
S=start_SB
S28
S<end_SB
NO
YES
S29
L=start_level
S30
L>end_level
NO
YES
S31
j=start_j
S32
j<(end_j+1)
NO
YES
S33
i=start_i
S34
i<(end_i+1)
NO
YES
S35
指定コードブロックを伸長
DECOMPRESS SPECIFIED CODE BLOCK
S36
i=i+1
S37
j=j+1
S38
L=L-1
S39
S=S+1
S40
ウェーブレット逆変換
PERFORM WAVELET INVERSE TRANSFORM
S41
P=P+1
S42
C=C+1
S43
逆色変換
PERFORM INVERSE COLOR CONVERSION
END
終了

FIG. 20

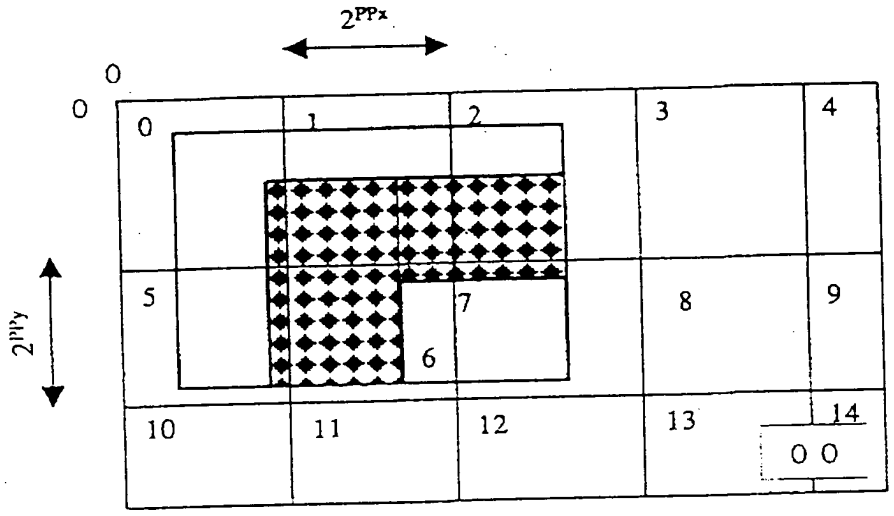


FIG. 21

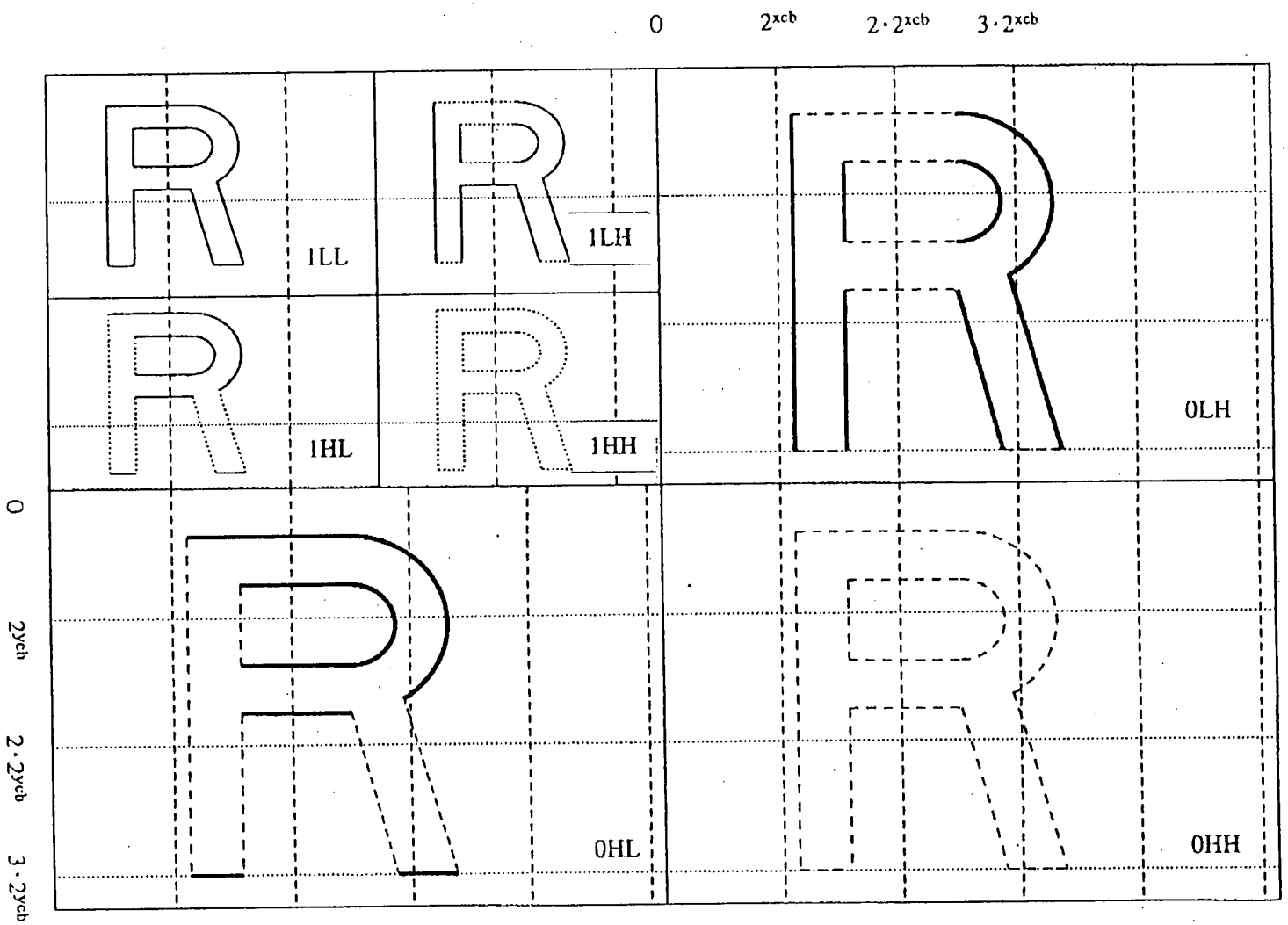

0
2^{xcb}
$2 \cdot 2^{xcb}$
$3 \cdot 2^{xcb}$
0
2^{ycb}
$2 \cdot 2^{ycb}$
$3 \cdot 2^{ycb}$
1LL
1LH
1HL
1HH
0LH
0HL
0HH

FIG. 22

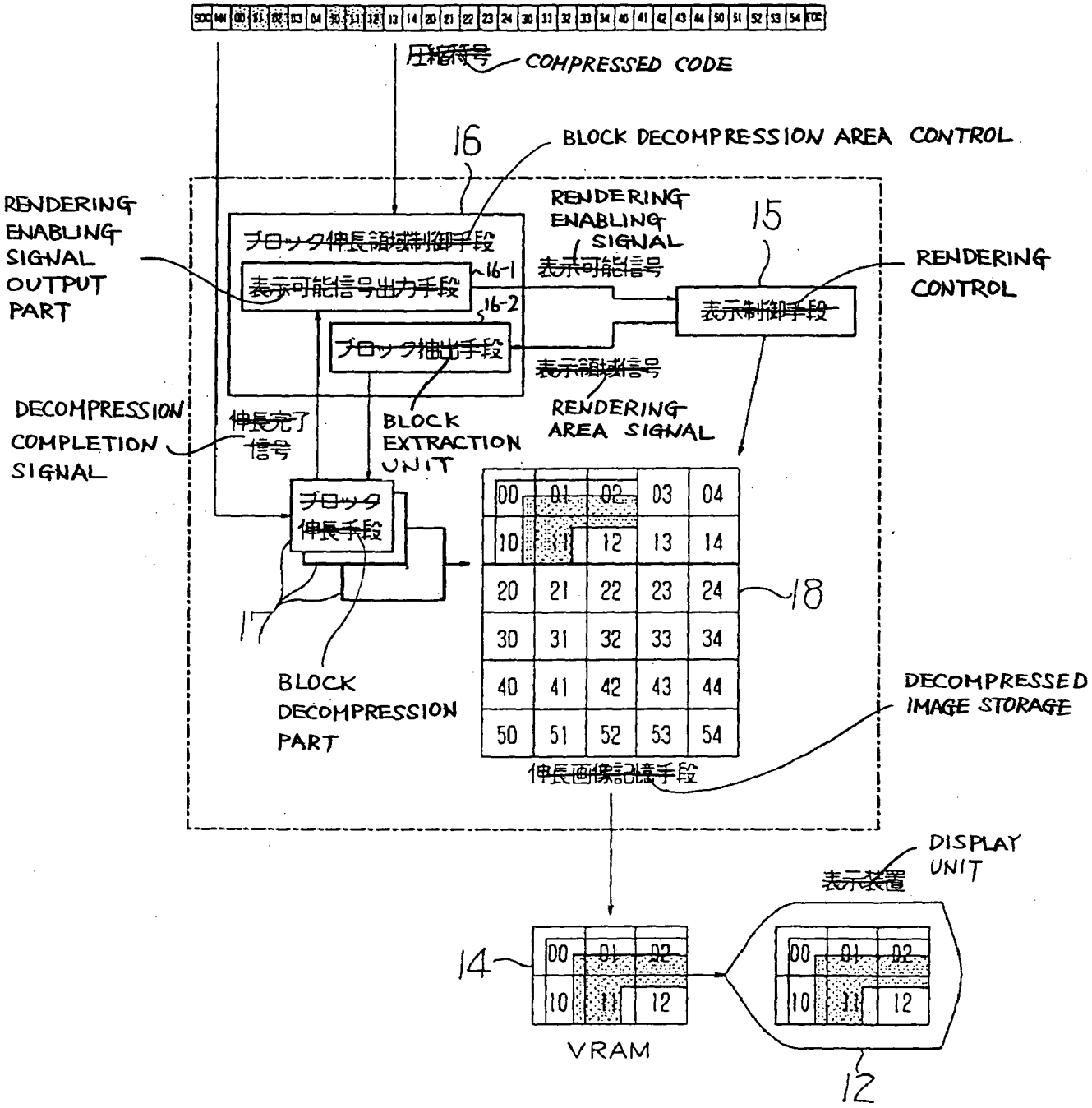

圧縮符号
COMPRESSED CODE
16
BLOCK DECOMPRESSION AREA CONTROL
RENDERING ENABLING SIGNAL OUTPUT PART
ブロック伸長領域制御手段
表示可能信号出力手段
16-1
16-2
ブロック抽出手段
RENDERING ENABLING SIGNAL
表示可能信号
15
RENDERING CONTROL
表示制御手段
表示領域信号
RENDERING AREA SIGNAL
DECOMPRESSION COMPLETION SIGNAL
伸長完了信号
BLOCK EXTRACTION UNIT
ブロック伸長手段
17
BLOCK DECOMPRESSION PART
18
伸長画像記憶手段
DECOMPRESSED IMAGE STORAGE
DISPLAY UNIT
表示装置
14
VRAM
12

FIG. 23

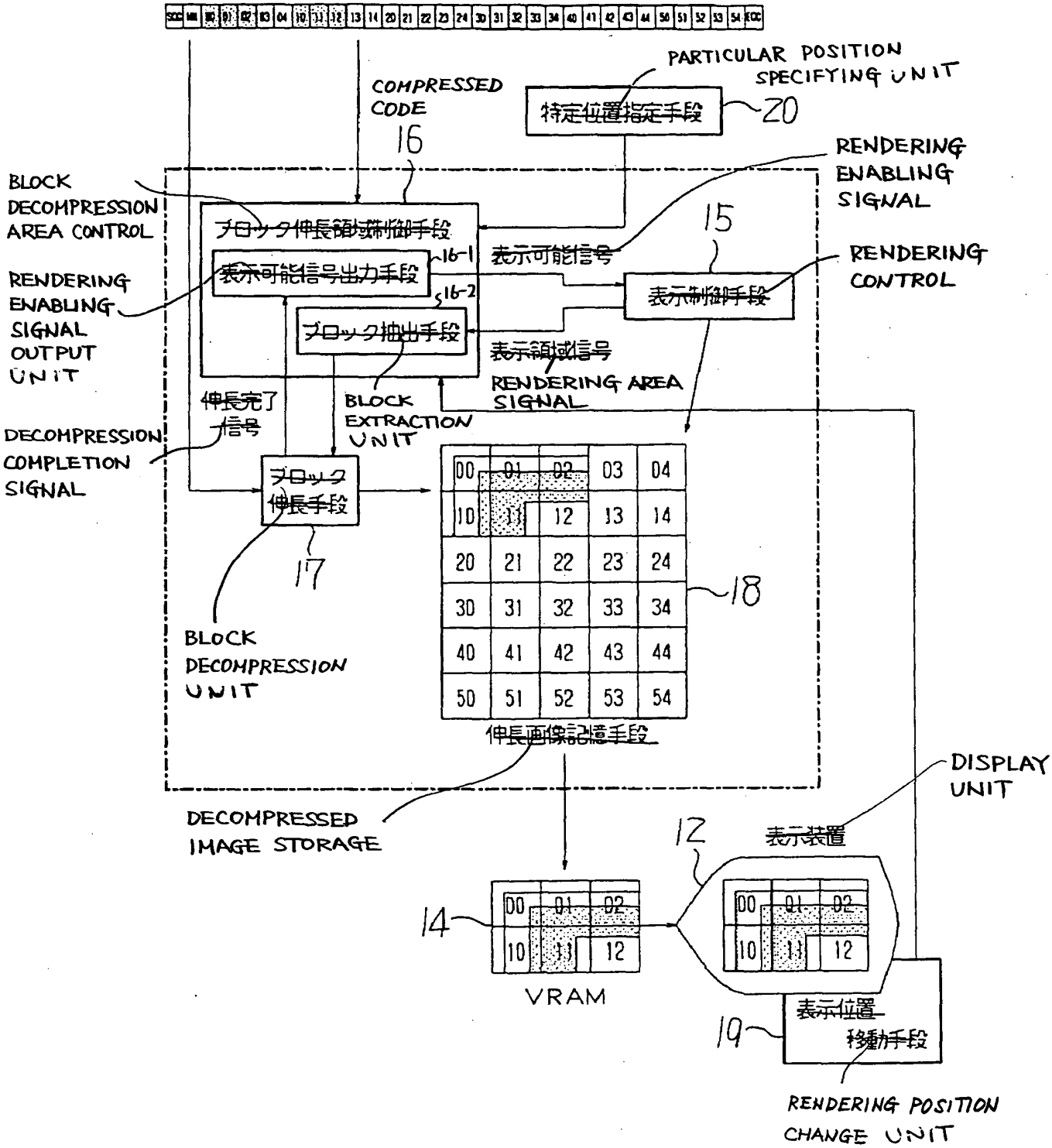

COMPRESSED CODE
16
PARTICULAR POSITION SPECIFYING UNIT
特定位置指定手段
20
RENDERING ENABLING SIGNAL
BLOCK DECOMPRESSION AREA CONTROL
ブロック伸長領域制御手段
表示可能信号出力手段
16-1
16-2
ブロック抽出手段
表示可能信号
15
表示制御手段
RENDERING CONTROL
RENDERING ENABLING SIGNAL OUTPUT UNIT
表示領域信号
RENDERING AREA SIGNAL
伸長完了信号
BLOCK EXTRACTION UNIT
DECOMPRESSION COMPLETION SIGNAL
ブロック伸長手段
17
BLOCK DECOMPRESSION UNIT
伸長画像記憶手段
18
DECOMPRESSED IMAGE STORAGE
DISPLAY UNIT
12
表示装置
14
VRAM
表示位置移動手段
19
RENDERING POSITION CHANGE UNIT

FIG. 24

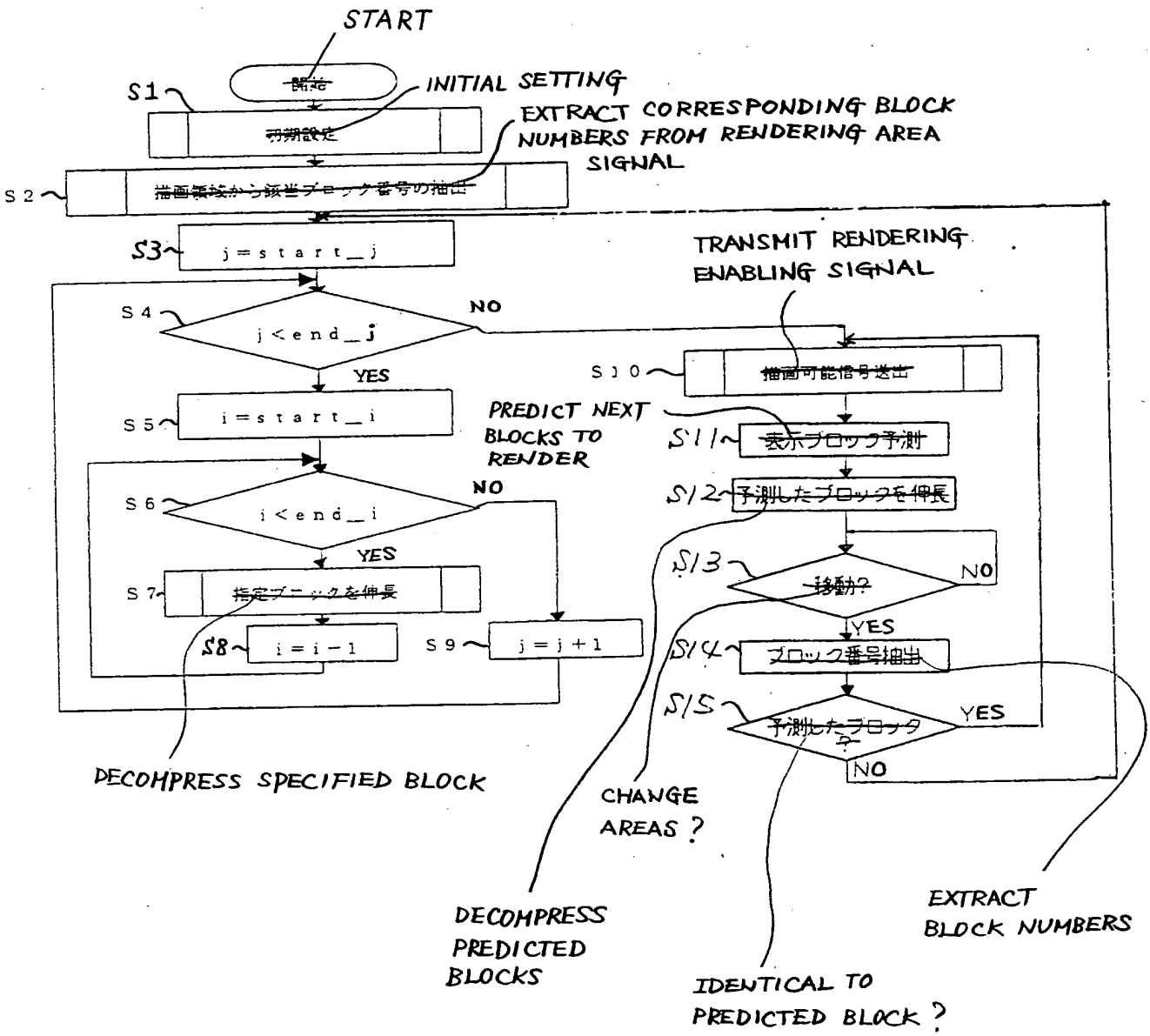
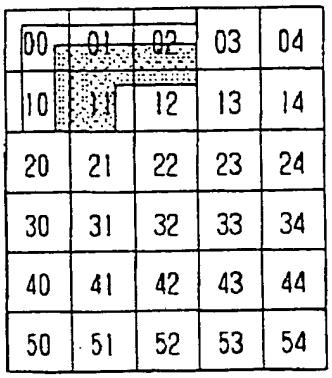

START
開始
S1
初期設定
INITIAL SETTING
EXTRACT CORRESPONDING BLOCK NUMBERS FROM RENDERING AREA SIGNAL
S2
描画領域から該当ブロック番号の抽出
S3
j = start_j
S4
j < end_j
NO
YES
S5
i = start_i
S6
i < end_i
NO
YES
S7
指定ブロックを伸長
S8
i = i - 1
S9
j = j + 1
DECOMPRESS SPECIFIED BLOCK
TRANSMIT RENDERING ENABLING SIGNAL
S10
描画可能信号送出
PREDICT NEXT BLOCKS TO RENDER
S11
表示ブロック予測
S12
予測したブロックを伸長
S13
移動?
NO
YES
S14
ブロック番号抽出
S15
予測したブロック?
YES
NO
CHANGE AREAS ?
DECOMPRESS PREDICTED BLOCKS
IDENTICAL TO PREDICTED BLOCK ?
EXTRACT BLOCK NUMBERS

FIG. 25


00
01
02
03
04
10
11
12
13
14
20
21
22
23
24
30
31
32
33
34
40
41
42
43
44
50
51
52
53
54

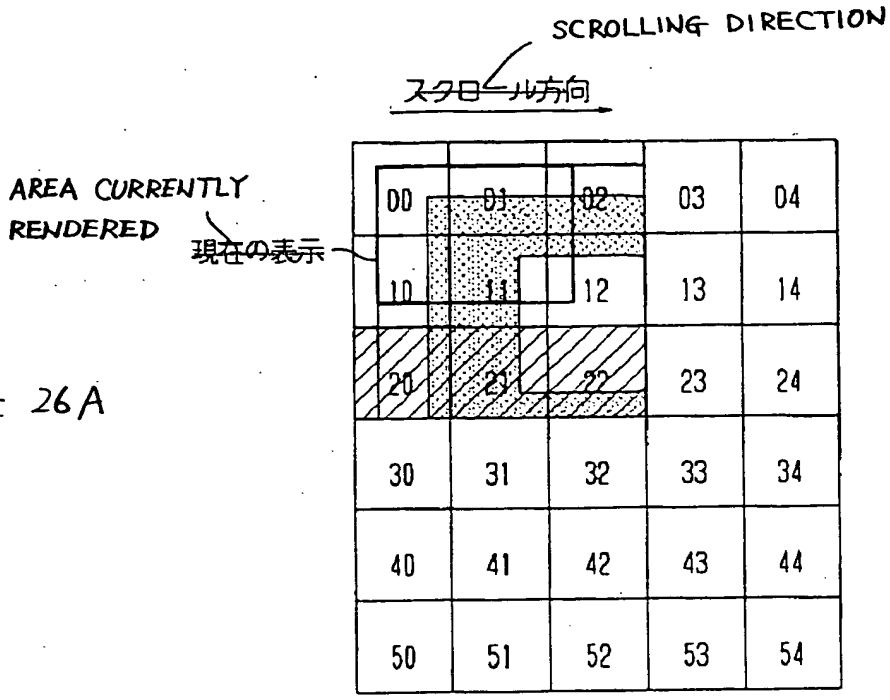


FIG. 26A

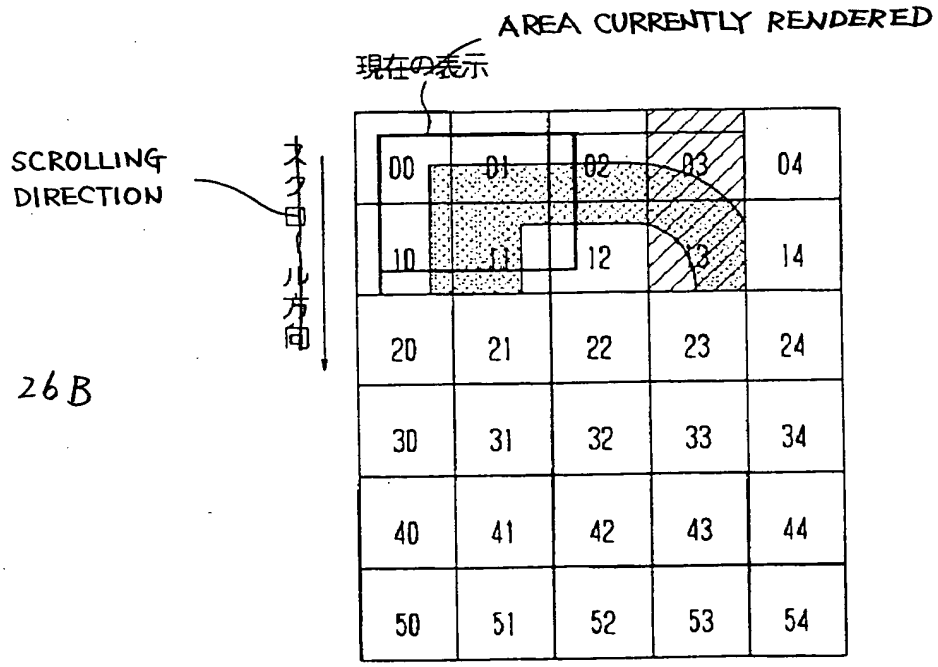
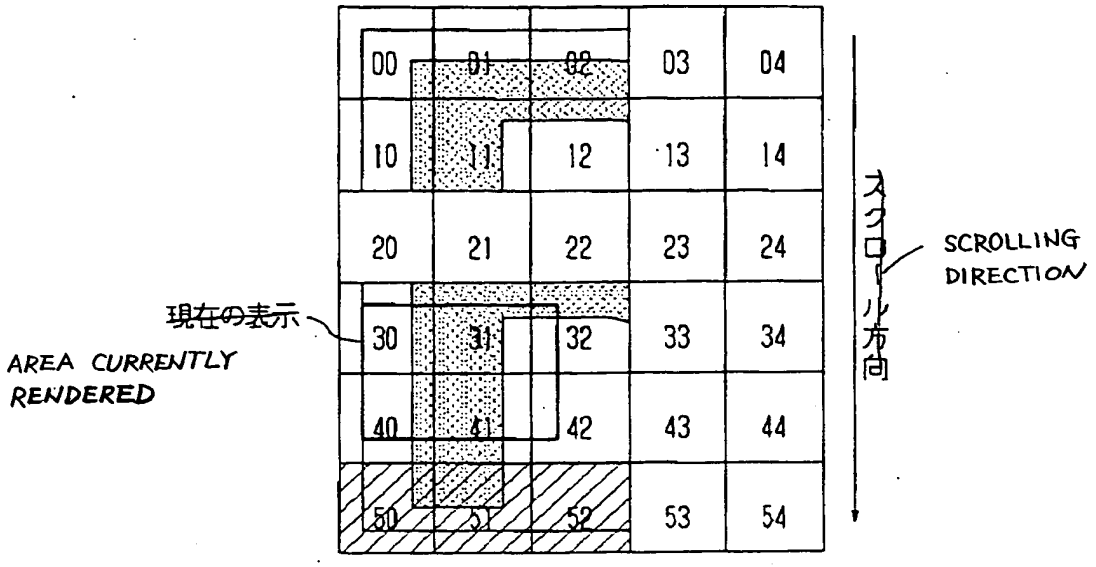


FIG. 26B

FIG. 27



~~【図17】~~

FIG. 28

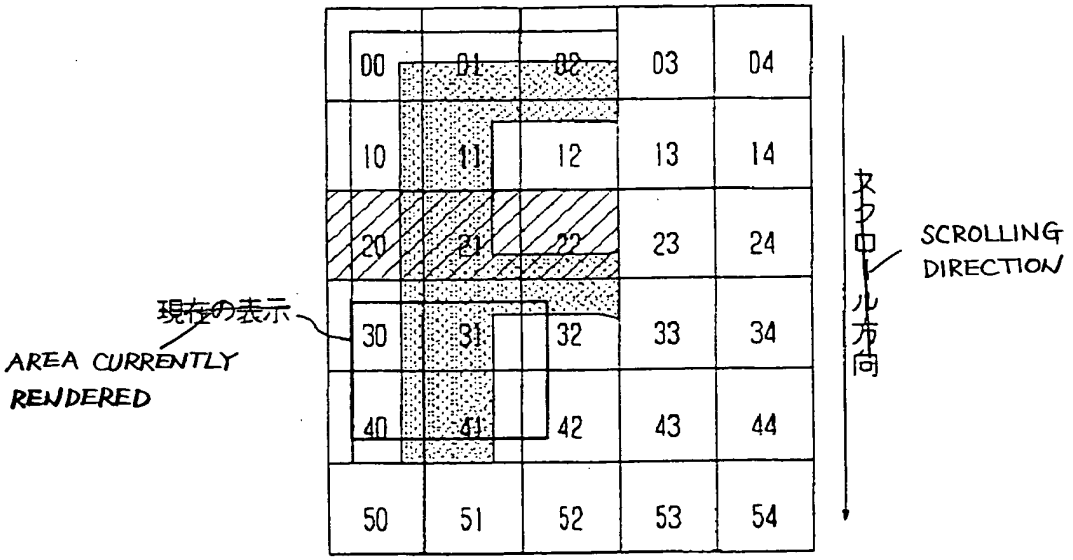


FIG. 29

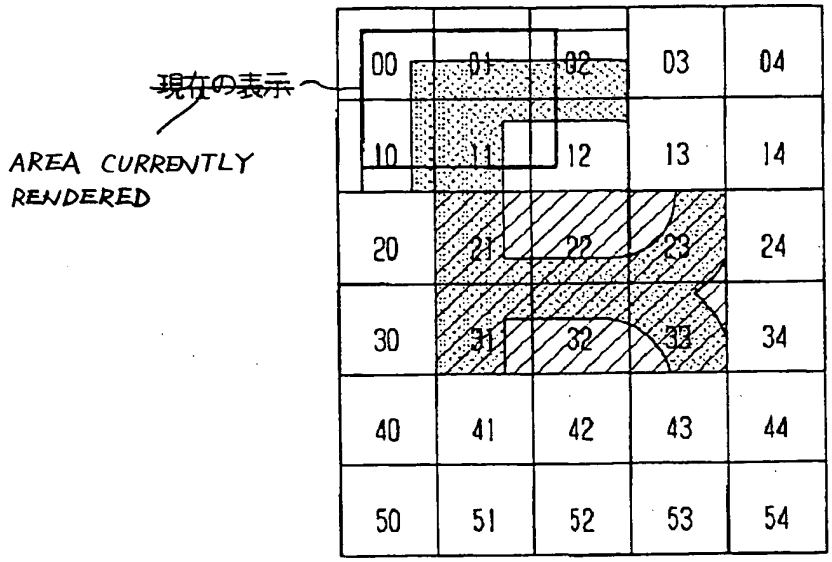

現在の表示
AREA CURRENTLY RENDERED
00
01
02
03
04
10
11
12
13
14
20
21
22
23
24
30
31
32
33
34
40
41
42
43
44
50
51
52
53
54

FIG. 30

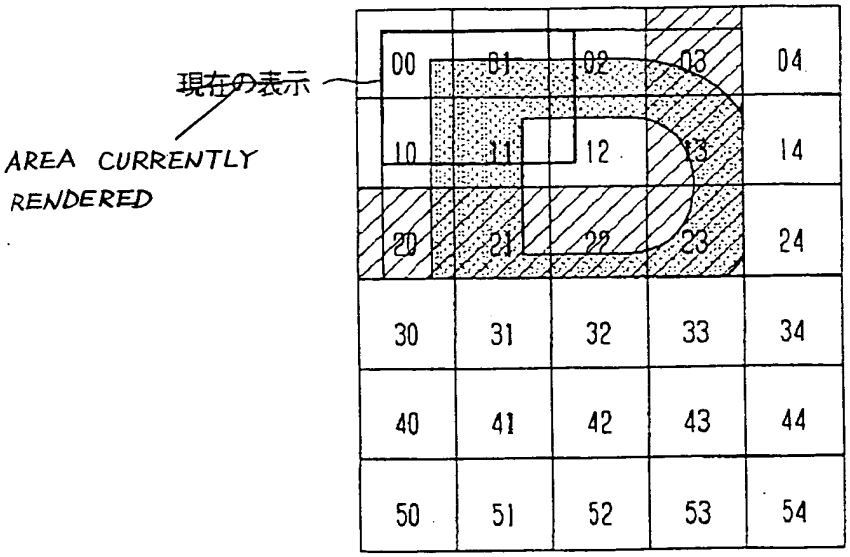

現在の表示
AREA CURRENTLY RENDERED
00
01
02
03
04
10
11
12
13
14
20
21
22
23
24
30
31
32
33
34
40
41
42
43
44
50
51
52
53
54

FIG. 31

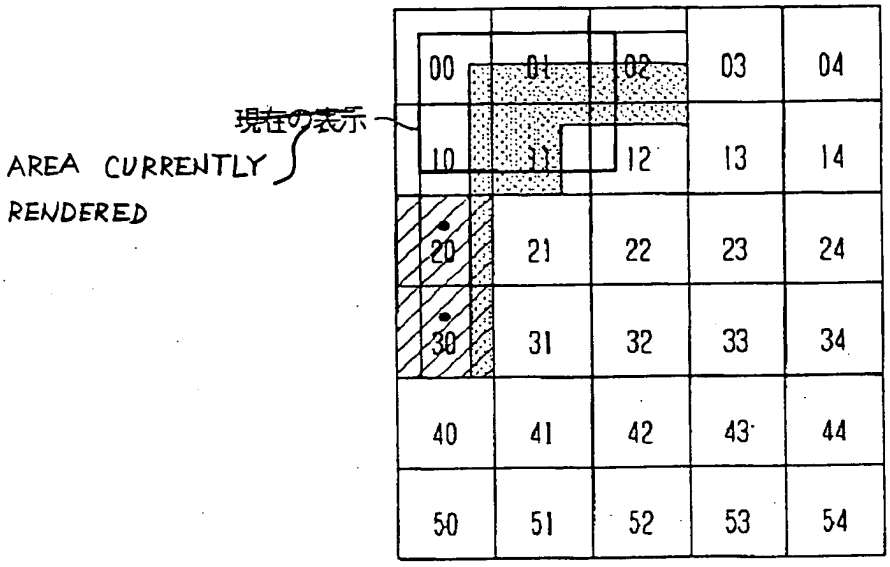
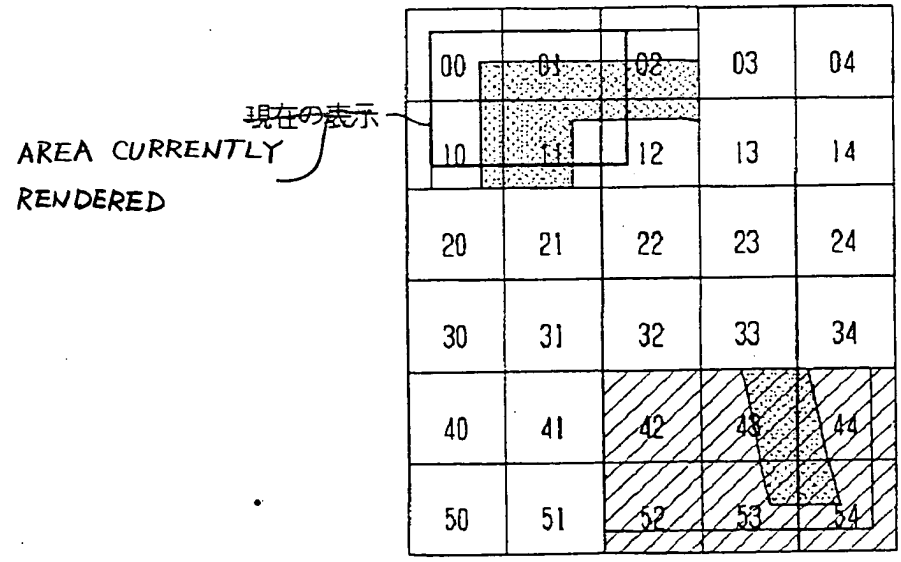

現在の表示
AREA CURRENTLY RENDERED
00
01
02
03
04
10
11
12
13
14
20
21
22
23
24
30
31
32
33
34
40
41
42
43
44
50
51
52
53
54

FIG. 32


現在の表示
AREA CURRENTLY RENDERED
00
01
02
03
04
10
11
12
13
14
20
21
22
23
24
30
31
32
33
34
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41
42
43
44
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51
52
53
54

FIG. 33

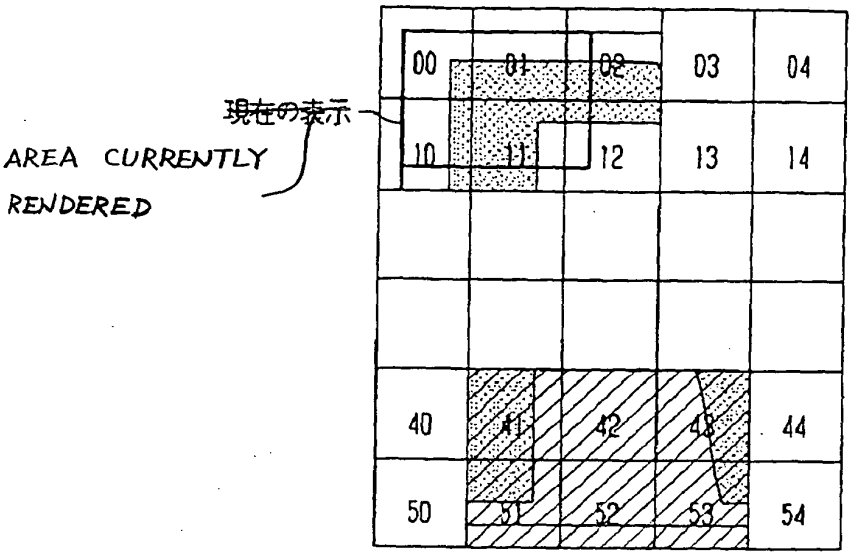

現在の表示
AREA CURRENTLY
RENDERED
00
01
02
03
04
10
11
12
13
14
40
41
42
43
44
50
51
52
53
54

FIG. 34

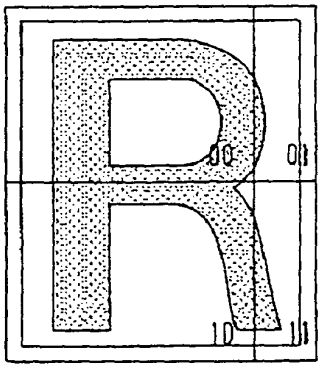

00
01
10
11

FIG. 35

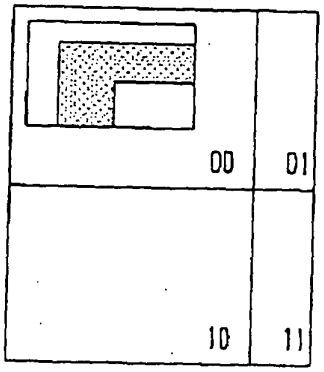


FIG. 36

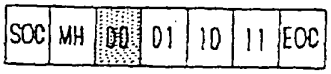


FIG. 37

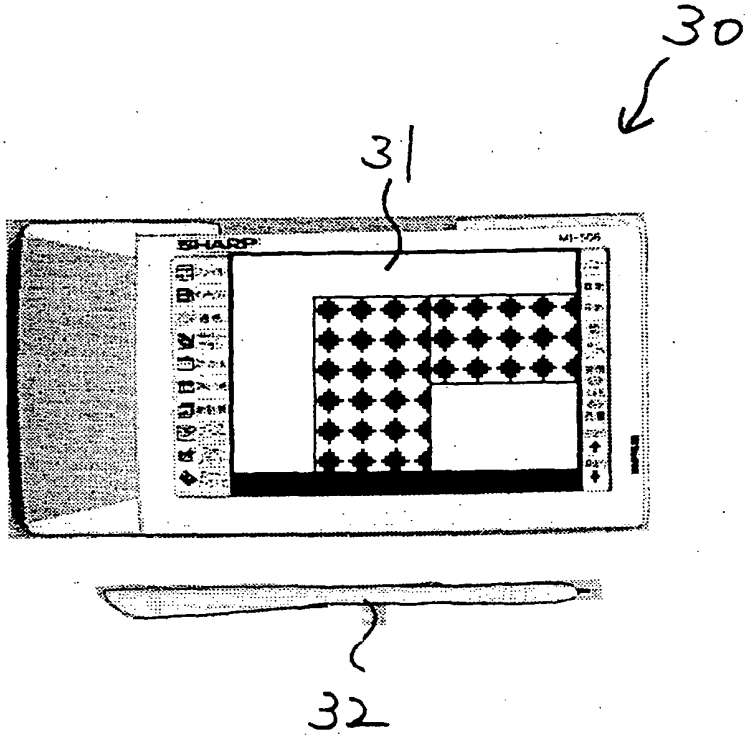


FIG. 38

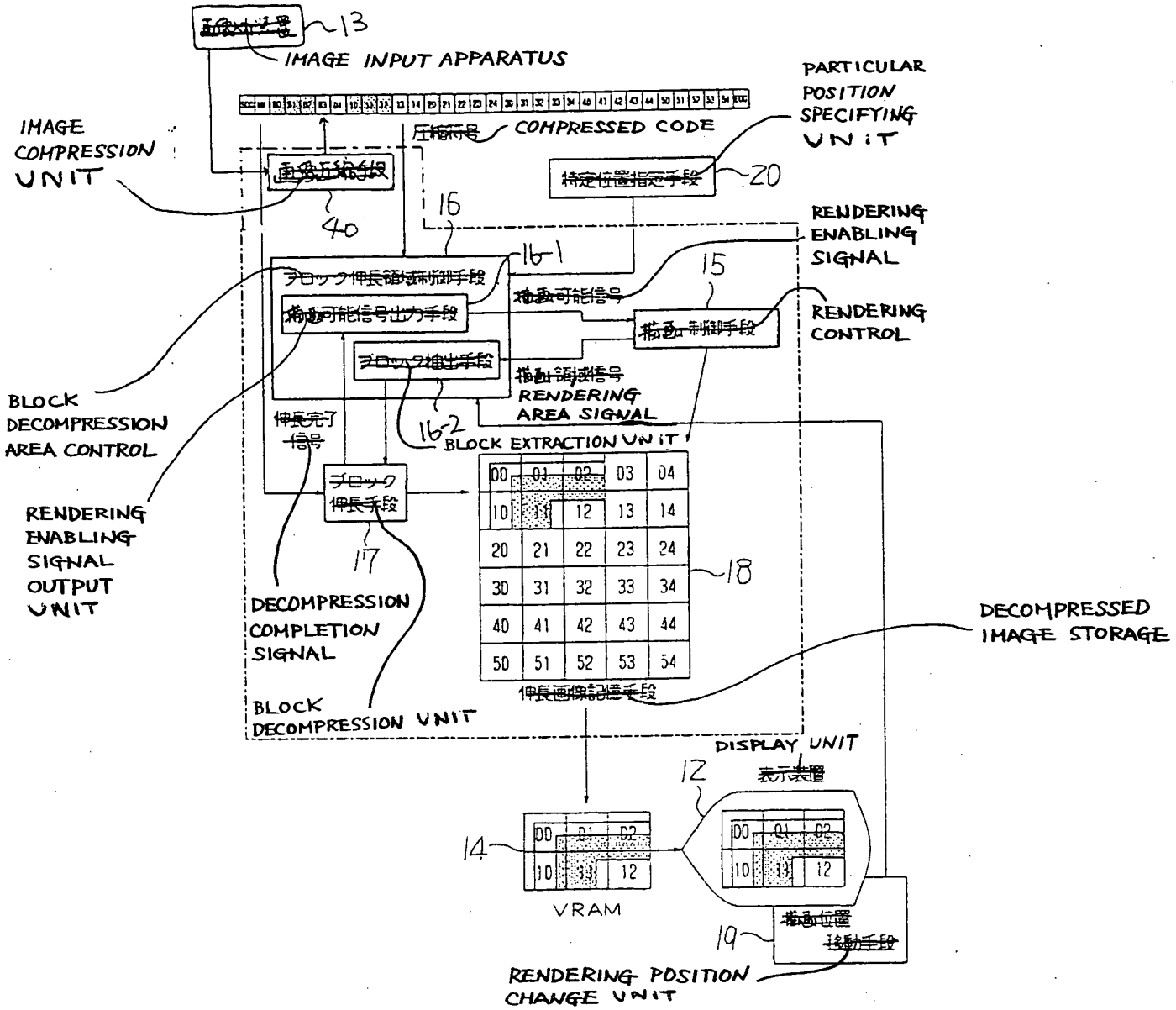
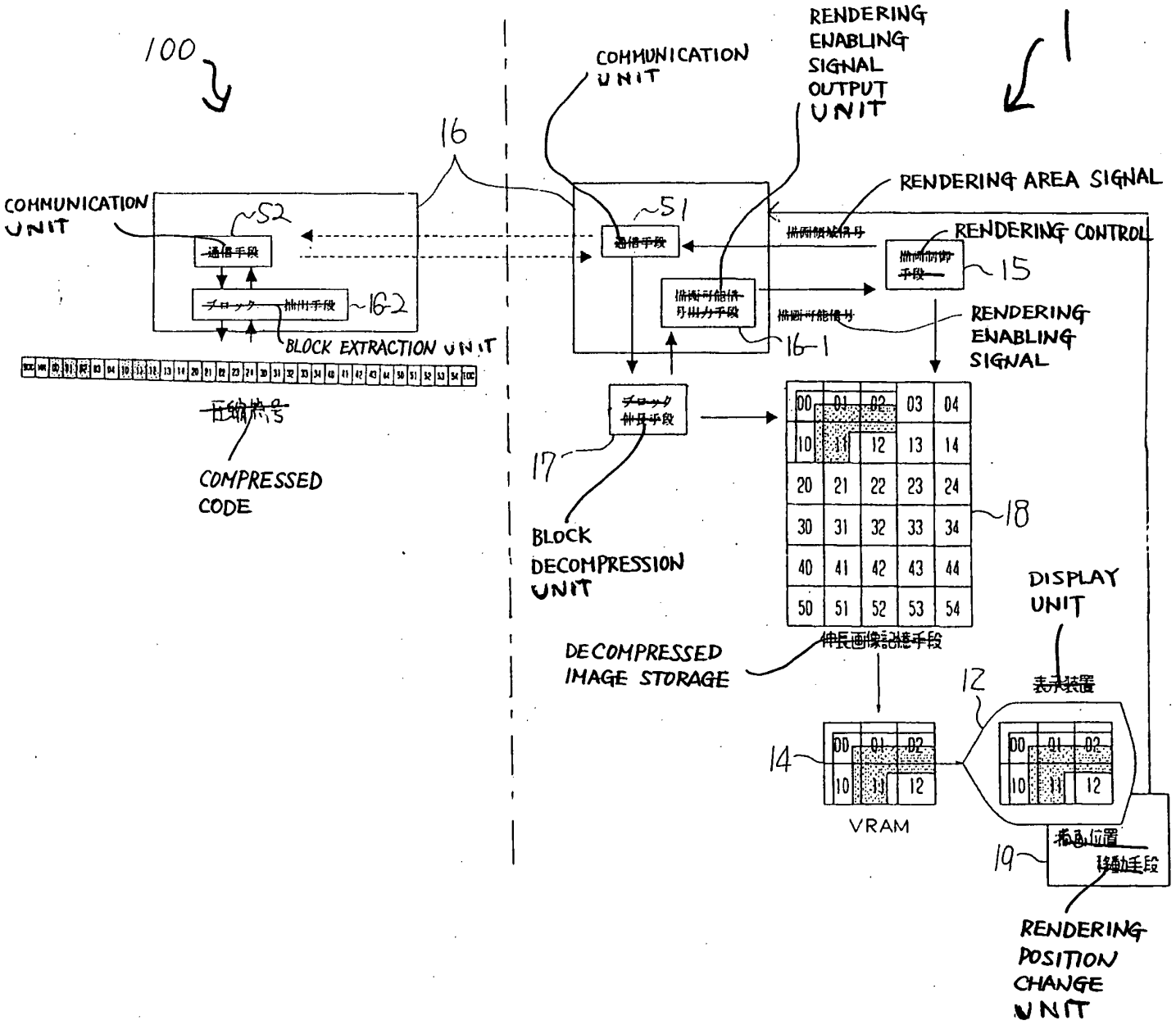

13
IMAGE INPUT APPARATUS
IMAGE COMPRESSION UNIT
40
COMPRESSED CODE
PARTICULAR POSITION SPECIFYING UNIT
20
16
16-1
RENDERING ENABLING SIGNAL
15
RENDERING CONTROL
BLOCK DECOMPRESSION AREA CONTROL
RENDERING AREA SIGNAL
16-2
BLOCK EXTRACTION UNIT
RENDERING ENABLING SIGNAL OUTPUT UNIT
17
18
DECOMPRESSION COMPLETION SIGNAL
DECOMPRESSED IMAGE STORAGE
BLOCK DECOMPRESSION UNIT
DISPLAY UNIT
12
14
VRAM
19
RENDERING POSITION CHANGE UNIT

FIG. 39


100
1
16
COMMUNICATION UNIT
RENDERING ENABLING SIGNAL OUTPUT UNIT
COMMUNICATION UNIT
52
51
RENDERING AREA SIGNAL
RENDERING CONTROL
15
162
BLOCK EXTRACTION UNIT
161
RENDERING ENABLING SIGNAL
COMPRESSED CODE
17
BLOCK DECOMPRESSION UNIT
18
DISPLAY UNIT
DECOMPRESSED IMAGE STORAGE
12
14
VRAM
19
RENDERING POSITION CHANGE UNIT